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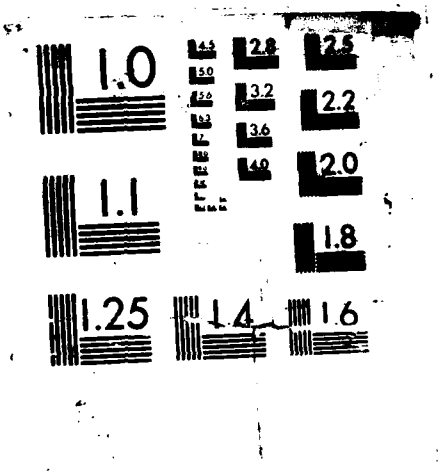

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The hisT gene codes for the tRNA modification enzyme, pseudouridine synthase I (PSUI). Recently we reported that this gene is a component of an operon that encodes at least one additional protein unrelated to PSUI[1].

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Structure of the E. coli his T Operon

Christopher C. Marvel, Peggy J. Arps*, and Malcolm E. Winkler*

Naval BioSciences Laboratory, School of Public Health,
University of California-Berkeley, Berkeley, CA 94720
*Northwestern University Medical School, Chicago, Ill.

The his T gene codes for the tRNA modification enzyme, pseudouridine synthase I (PSUI). Recently we reported that this gene is a component of an operon that encodes at least one additional protein unrelated to PSUI[1].

The DNA sequence of a 2.3 kilobase segment of the his T operon has now been determined. An open reading frame corresponding to the structual gene for PSUI has been identified. Genetic mapping and N-terminal analysis of purified PSUI confirm this identification. The gene codes for a 30,399 dalton polypeptide whose translation start overlaps the stop codon of an upstream gene.The upstream gene codes for a 36,364 dalton polypeptide of unknown function. Computer analysis at the protein and DNA level demonstrates that the upstream gene and PSUI gene are evolutionarily, structually, and functionally unrelated.

Codon usage in the upstream gene is radically different from the PSUI gene and may be important in explaining the differential gene expression seen in vitro. The codon usage for the PSUI gene contains rare codons and is similar to that seen in the low translation products of the dnaG, urvC, and trmD genes. The observation that both his T and trm D (which encodes the tRNA modification enzyme m^1G methyltransferase) are organized into differentially-expressed operons may suggest a common arrangment for genes that encode modification enzymes.

(1) Marvel, C.C.,Arps, P.J., Rubin, B.C., Kammen, H.O., Penhoet, E.E., and Winkler, M.E. J. of Bact. (1985) 161, 60-71.

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